

FISH MANAGEMENT REPORT 122

WINTER CREEL CENSUS ON LAKE NOQUEBAY, MARINETTE COUNTY

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ABSTRACT

A winter creel census was conducted on Lake Noquebay, Marinette County, between 20 December 1981 and 15 April 1982. During the census, 3,051 anglers were interviewed. These anglers fished an estimated 32,142 hours. The harvest from the lake was 20,997 fish, with panfish making up 87% of the catch. The harvest rate was 0.65 fish/hour. Northern pike were the primary game fish taken. The majority of the anglers came from less than 25 miles to ice fish on Lake Noquebay, and there were no anglers from out of state. Although Lake Noquebay has been managed for walleyes, they made up less than 1% of the overall harvest. Managing this lake for bass, panfish, and northern pike should be considered in the future.

INTRODUCTION

Lake Noquebay is the largest inland lake in Marinette County (Fig. 1) and one of the most popular recreational lakes in the county. Frequent surveys of Lake Noquebay's fish population (M.E. Burdick, unpubl. data, 1980) and a creel census on the lake's sport fishery during the 1977 open water season (Thuemler 1981) have been conducted. The objective of this study was to quantify the angling pressure and harvest during the ice fishing season of 1981-82. This information is needed to determine the proper fish management program for the lake.

STUDY AREA

Lake Noquebay is 2,409 acres and is located in southern Marinette County, about 17 miles northwest of Marinette. It is a hard water drainage lake having slightly alkaline light brown water of moderate transparency. Maximum depth is 54 ft, although 87% of the lake is less than 20 ft deep (Fig. 2). Other characteristics of Lake Noquebay are given in the open water creel census report (Thuemler 1981).

A diverse fish population with 29 known species exists in the lake (Table 1). The dominant game fish are northern pike, largemouth bass, brook trout, and walleye; bluegills, pumpkinseeds, and yellow perch comprise the bulk of the panfish population. Walleyes are the only species presently stocked in the lake; however brook and brown trout are stocked in Middle Inlet Creek, a tributary to Lake Noquebay.

There are about 280 dwellings on Lake Noquebay's shore. Access can be obtained from a county park and five public boat launching facilities (Fig. 2).

METHODS

A random stratified creel census was conducted on Lake Noquebay for the period 20 December 1981 through 15 April 1982. This corresponded with the time anglers were able to get on the ice to fish. The season was open to all fishing until 1 March 1982, after which time only panfish were legal to take. Methods used on this census follow those described by Lambou (1961).

A census clerk made counts of anglers on the open-ice and those in ice shanties at 2-hour intervals from 7 a.m. to 5 p.m. The entire census was based on a 12-hour fishing day between 6 a.m. and 6 p.m. No effort was made to estimate fishing pressure before or after these times. Between counts, a check was made on the number of occupied shanties; anglers were interviewed for information on the size of their party; number, length, and species of fish caught; type of bait used; length of fishing trip; and angler's residence. If an angler was contacted more than once in the same day, only the time fished and the catch since the previous contact were recorded. During the census 3,051 anglers were interviewed.

The periods during the middle of the day, at 11 a.m. and 1 p.m., were given twice the census effort that the other periods received. Two-thirds of all the weekend times were sampled, while 40% of all the weekday periods were censused. Holidays were treated as weekend days. The weekend and weekday data were analyzed separately, as were the data for each month.

Average number of anglers per count was determined by adding the number of anglers on open ice per count with the number derived by multiplying the total shanty count x the occupancy rate x the average number of anglers/shanty. Average daily fishing pressure was then calculated by multiplying the average number of anglers/count x the length of the period between counts (2 hours) x the total number of counts/day (6). Total pressure for the month was then obtained by taking the daily pressure for that month x the number of days in the month.

Harvest rates were obtained by dividing the total number of fish harvested (as shown on the interview forms) by the total number of hours fished (as shown on the interview forms). Harvest rates were calculated by species on a monthly basis. Total number of fish harvested was obtained by multiplying the harvest rate x the estimated total fishing pressure.

The creel clerk measured a sample of 200 fish/species on a monthly basis throughout the census.

RESULTS AND DISCUSSION

Fishing Pressure

Between 20 December 1981 and 15 April 1982, 32,142 hours or 13.3 hours/acre were spent ice fishing on Lake Noquebay. This is a minimal figure, as our census only covered the 12-hour periods between 6 a.m. and 6 p.m.; however, it is assumed that little fishing pressure takes place after these hours.

February was the month with the highest fishing pressure at 48% of the season's total. This was probably due in part to a fishing derby on the lake during the last weekend in February and to the extremely cold and blizzard conditions during three of the January weekends (Fig. 3). Weekend anglers accounted for 42% of the season's total fishing pressure. The unusually long winter allowed ice anglers to fish up until mid-April; in most years ice fishing would be over by the end of March.

Most anglers fished in the late morning and early afternoon hours (Fig. 4), and this was the same for both weekends and weekdays. On the average fishing day, 275 angler hours were expended. This compares with an average of 563 angler hours/day during the open water fishing season. The average completed fishing trip on Lake Noquebay during the ice fishing season was 4.7 hours. This equates to 6,824 individual angler trips.

The combined angling pressure from winter and open water creel censuses was 47.7 hours/acre (Table 2). This figure can be compared with other creel census data for Wisconsin lakes (Table 3). The average angling pressure for all 15 studies listed is 66 angler hours/acre. However, of the 15 studies, 7 had a higher pressure and 7 a lower pressure than Lake Noquebay.

Harvest

During the 1981-82 ice fishing season, 20,997 fish were harvested from Lake Noquebay. No estimates were made on the number of fish caught and returned to the water. The open water fishing season in 1977 accounted for over 5 times the ice fishing harvest.

The overall harvest rate for the ice fishing season was 0.65 fish/hour or roughly 50% of the rate for the 1977 open water season (Table 4). Catch rate was greatest for bluegill (0.44 fish/hour) and least for brown trout, smallmouth bass, and bowfin (0.001 fish/hour). The walleye catch rate was 0.003 fish/hour.

Twelve species of fish were taken during the ice fishing season (Table 5). Bluegills made up 2/3 of the total harvest. This species also dominated the catch during the 1977 open water season. The primary game fish caught, as in the 1977 open water census, was the northern pike. Brook trout, which were not taken at all during the open water season, were the second most prevalent game fish in the ice fishing census. Bluegills averaged 7.9 inches during the ice fishing season compared to only 6.9 inches in the open water season (Table 6).

Length frequency diagrams for the major species are given in Fig. 5-10. The large average size of the panfish is one of the main reasons for Lake Noquebay's popularity with anglers in the area. The average length of most species of fish harvested during the ice fishing season compares with the open water season of 1977.

Panfish made up 87% of the total harvest during the ice fishing season on Lake Noquebay. This was what attracted anglers to the lake. Game fish were just an incidental catch for anglers who were primarily interested in catching panfish.

It is interesting to compare the makeup of the catch during the ice fishing season with the open water season (Table 5). Both black crappie and northern pike were caught far more frequently by the ice angler than by the open water angler. Langhurst (in press) found the same to be true in a creel census on Shawano Lake. Pumpkinseeds, however, made up 16% of the catch during the open water season and accounted for only 1% of the catch of the ice angler.

The hours after dark were not censused in this survey; however, the pressure and harvest during this period of time were considered to be minimal.

Angler Characteristics

Males accounted for 90% of the 3,051 anglers interviewed. Anglers between the ages of 16 and 64 made up 86% of the total. Those under the age of 16 accounted for 8%, while those over 65 made up 6%.

Fifty-two percent of the anglers had caught at least one fish during a fishing trip. A completed fishing trip lasted an average of 4.7 hours, which was over 2 hours longer than the completed trips during the open water season.

Fig. 11 shows the distance anglers traveled to fish Lake Noquebay and gives a comparison of the open water vs ice fishing season. There were no out-of-state anglers that fished the lake during the 1981-82 ice fishing season. In general, the local anglers dominated the ice fishing season much more than they did the open water season.

The amount of fishing pressure done by open ice vs shanty anglers was almost the same over the entire season. There were many more shanty anglers during the extremely cold month of January; however, open ice anglers outnumbered them during the other months of the census.

The highest number of ice shanties at any one time--79--occurred in mid-February. The season average was just over 2 and 1/2 anglers/shanty with an average occupancy rate of 11%.

MANAGEMENT RECOMMENDATIONS

Lake Noquebay is one of the most popular recreational lakes in the area. It is the largest lake in Marinette County, is relatively close to the cities of Marinette and Menominee, and is only a 1-hour drive from Green Bay. Compared to other Wisconsin lakes surveyed, Lake Noquebay ranks in the middle in annual angling effort.

The lake harbors an excellent panfish population in terms of quantity and quality. This is what attracts most anglers. Although over 90,000 bluegills are taken from the lake on an annual basis, exploitation rates are not high enough to affect the size of the fish harvested. Bluegills taken during the 1977 open water season averaged 6.9 inches in length, while those taken during the ice fishing season in 1981-82 averaged 7.9 inches. Other species of panfish, on the average, are also considerably larger than those caught in most other area lakes. Our present management of the lake's panfish population is producing excellent results, good numbers of large-sized fish, and there is no need for any changes in this management plan.

Lake Noquebay has been managed for walleyes in the past; however, they presently make up only 0.5% of the overall harvest. If future surveys show no increase in the walleye population, discontinuing the walleye stocking program should be considered.

Northern pike were the primary game fish taken by Lake Noquebay anglers. The average length of these northern pikes appears to be fairly small, only 18.2 inches during the ice fishing season and 18.4 inches for the open water season. Other studies in Wisconsin show the average size of northern pike in the harvest to be quite similar to those taken from Lake Noquebay (Langhurst, in press; Lealos and Bever 1982; Kempinger et al. 1975). Further regulation of the northern pike fishery does not seem to be warranted at this time. Growth rates of northern pike in Lake Noquebay are below the regional average, and any size limit may have a tendency to stockpile fish in the smaller size groups.

The present management of Lake Noquebay has resulted in a very good fishery. Current regulations are adequate to manage this fishery, and no changes are recommended at this time.

A creel census, such as the one conducted on Lake Noquebay, can provide angling pressure, harvest, and exploitation data on individual lakes, and add to our statewide data base. This type of information on Wisconsin waters, although very valuable, is frequently lacking. The cost of obtaining this data may seem high initially; however, its importance in designing the proper management plan for these waters cannot be overemphasized.

TABLE 1. Known species of fish in Lake Noquebay, Marinette County, Wisconsin.*

Common Name	Scientific Name
Brook trout	<u>Salvelinus fontinalis</u>
Brown trout	<u>Salmo trutta</u>
Northern pike	<u>Esox lucius</u>
Muskellunge	<u>Esox masquinongy</u>
Largemouth bass	<u>Micropterus salmoides</u>
Smallmouth bass	<u>Micropterus dolomieu</u>
Walleye	<u>Stizostedion vitreum vitreum</u>
Black bullhead	<u>Ictalurus melas</u>
Yellow bullhead	<u>Ictalurus natalis</u>
Brown bullhead	<u>Ictalurus nebulosus</u>
Rock bass	<u>Ambloplites rupestris</u>
Pumpkinseed	<u>Lepomis gibbosus</u>
Warmouth	<u>Lepomis gulosus</u>
Bluegill	<u>Lepomis macrochirus</u>
Black crappie	<u>Pomoxis nigromaculatus</u>
Yellow perch	<u>Perca flavescens</u>
Longnose gar	<u>Lepisosteus osseus</u>
Bowfin	<u>Ambloplites calva</u>
Central mudminnow	<u>Umbra limi</u>
Golden shiner	<u>Notemigonus crysoleucas</u>
Common shiner	<u>Notropis cornutus</u>
Spottail shiner	<u>Notropis hudsonius</u>
Mimic shiner	<u>Notropis volucellus</u>
Bluntnose minnow	<u>Pimephales notatus</u>
White sucker	<u>Catostomus commersoni</u>
Northern hog sucker	<u>Hypentelium nigricans</u>
Shorthead redhorse	<u>Moxostoma macrolepidotum</u>
Johnny darter	<u>Etheostoma nigrum</u>
Logperch	<u>Percina caprodes</u>

*from unpublished data, DNR Bureau of Fish Management files.

TABLE 2. Comparison of winter and open water fishing season on Lake Noquebay, Wisconsin.

Statistic	Open Water May-Sep 1977	Ice Fishing Dec 1981-Apr 1982	Combined
Fishing pressure (hours)	82,758	32,142	114,900
Fishing pressure (hours/acre)	34.4	13.3	47.7
Angler trips (number)	31,830	6,824	38,654
Average trip length (hours)	2.6	4.7	--
Number of fish harvested	109,413	20,997	130,410
Harvest rate (fish/hours)	1.28	0.65	--

TABLE 3. Estimated fishing pressure on several Wisconsin lakes.

Lake	Acreage	Angler Hours/Acre	Reference
Bass Lake	142	49	Helzer, pers. comm. 1982
Beaver Dam Lake	6,542	25	Congdon, pers. comm. 1980
Boot Lake	235	99	Helzer, pers. comm. 1982
Bucks Lake	83	20	Snow & Beard 1972
Clear Lake	846	17	Marinac-Saunders & Coble 1981
Osgrove Lake	75	46	Helzer, pers. comm. 1980
Devils Lake	379	106	Brynjildson et al. 1970
Elwood Lake	132	35	Helzer, pers. comm. 1980
Escanaba Lake	293	65	Kempinger et al. 1975
Flambeau Flowage	13,545	16	Lealos & Bever 1982
Fox Lake	2,625	268	Congdon, pers. comm. 1980
Lake Noyebay	2,409	48	Present study
Murphy Flowage	180	74	Snow 1978
Nebish Lake	94	45	Christenson et al. 1982
Shawano Lake	6,178	73	Langhurst, In press

TABLE 4. Harvest rates of various fish taken from Lake Noyebay, December 1981-April 1982.

Species	Harvest Rate (fish/hour)					
	Average	December	January	February	March	April
Bluegill	.44	.34	.37	.31	.73	1.06
Black crapple	.09	.01	.07	.04	.23	.21
Northern pike	.07	.11	.13	.08	--	--
Yellow perch	.03	.11	.02	.02	.04	.05
Pumpkinseed	.01	.00	.00	.01	.01	.01
Brook trout	.01	.01	.03	--	--	--
Largemouth bass	.00	.01	--	.01	--	--
Walleye	.00	.01	.00	.00	--	--
Rock bass	.00	.01	.00	.00	.01	.00
Brown trout	.00	.00	--	.00	--	.00
Smallmouth bass	.00	.01	--	--	--	.00
Bowfin	.00	--	--	.00	--	.00
All species	.65	.62	.62	.47	1.02	1.33

TABLE 5. Comparison of estimated harvest for winter and open water season on Lake Noquebay.

Species	Ice Fishing 1981-82		Open Water 1977	
	Number Harvested	% of Harvest	Number Harvested	% of Harvest
Bluegill	14,132	67	79,538	73
Black crapple	2,766	13	602	1
Northern pike	2,375	11	3,734	3
Yellow perch	1,032	5	1,675	1
Pumpkinseed	212	1	17,191	16
Brook trout	170	1	0	--
Rock bass	109	1	4,400	4
Largemouth bass	93	1	1,356	1
Walleye	89	1	546	1
Brown trout	11	1	0	--
Smallmouth bass	5	1	78	1
Warmouth	0	--	200	1
Bullhead	0	--	93	1
Bowfin	3	<1	0	--
Total	20,997		109,413	

TABLE 6. Comparison of average lengths of fish harvested from Lake Noquebay, Wisconsin during the ice fishing season of 1981-82 and the open water season of 1977.

Species	Average Length	
	Open Water, 1977	Ice Fishing, 1981-82
Black crapple	9.5"	10.1"
Bluegill	6.9"	7.9"
Yellow perch	7.0"	7.0"
Brook trout	---	9.8"
Brown trout	---	20.0"
Largemouth bass	11.2"	14.8"
Rock bass	7.9	8.4"
Smallmouth bass	14.7"	13.2"
Walleye	16.3"	18.5"

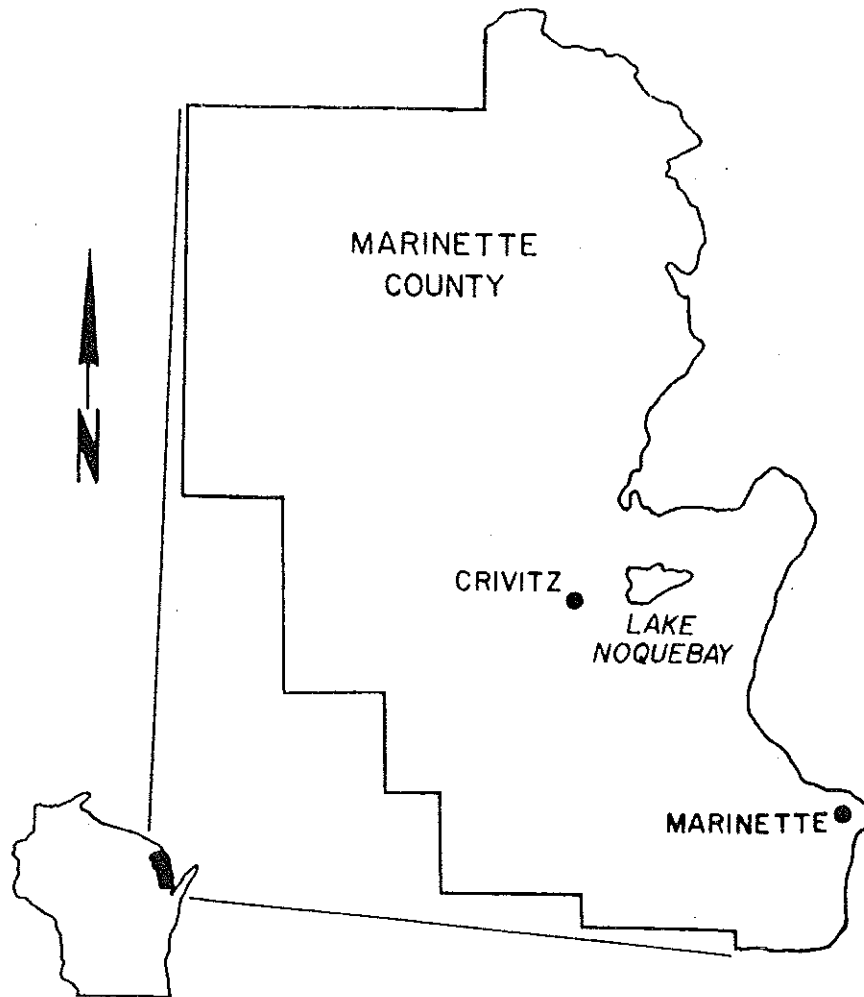


FIGURE 1. Location of Lake Noquebay, Marinette County, Wisconsin.



FIGURE 2. Hydrographic map of Lake Noquebay.

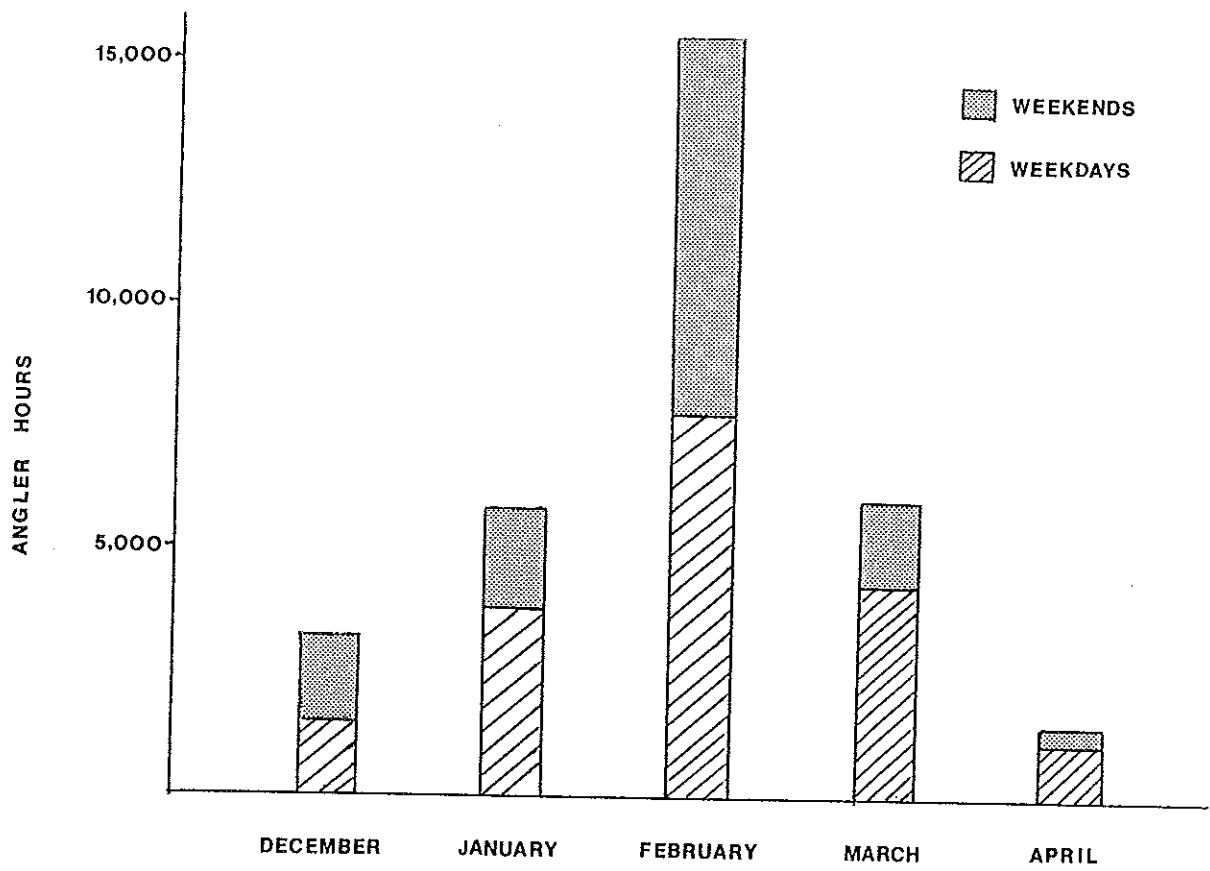


FIGURE 3. Distribution of winter fishing pressure on Lake Noquebay, by month, 1981-82.

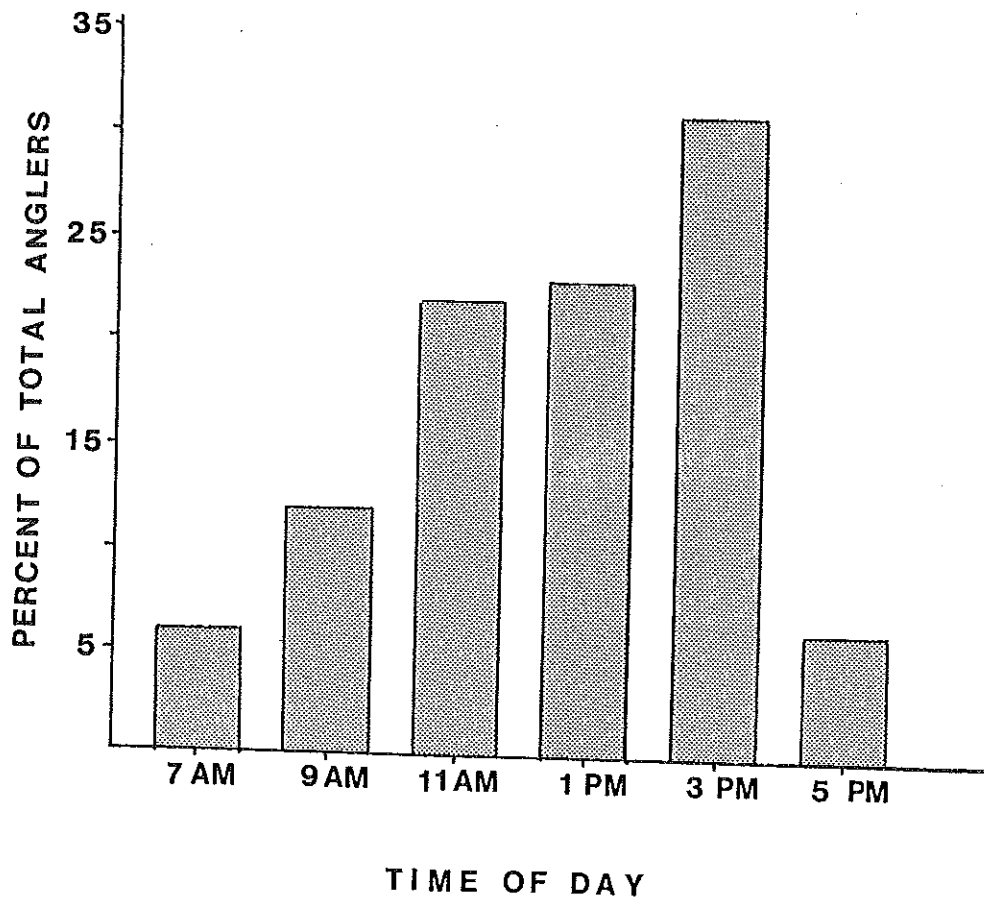
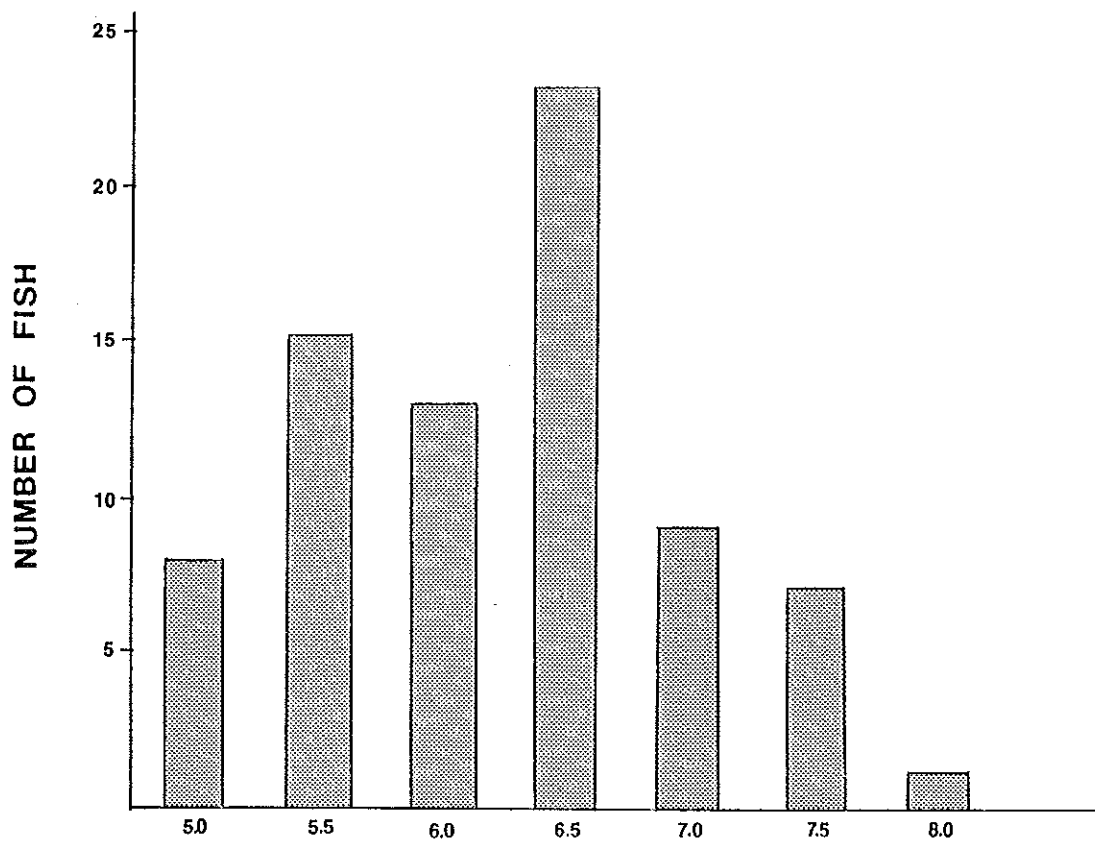
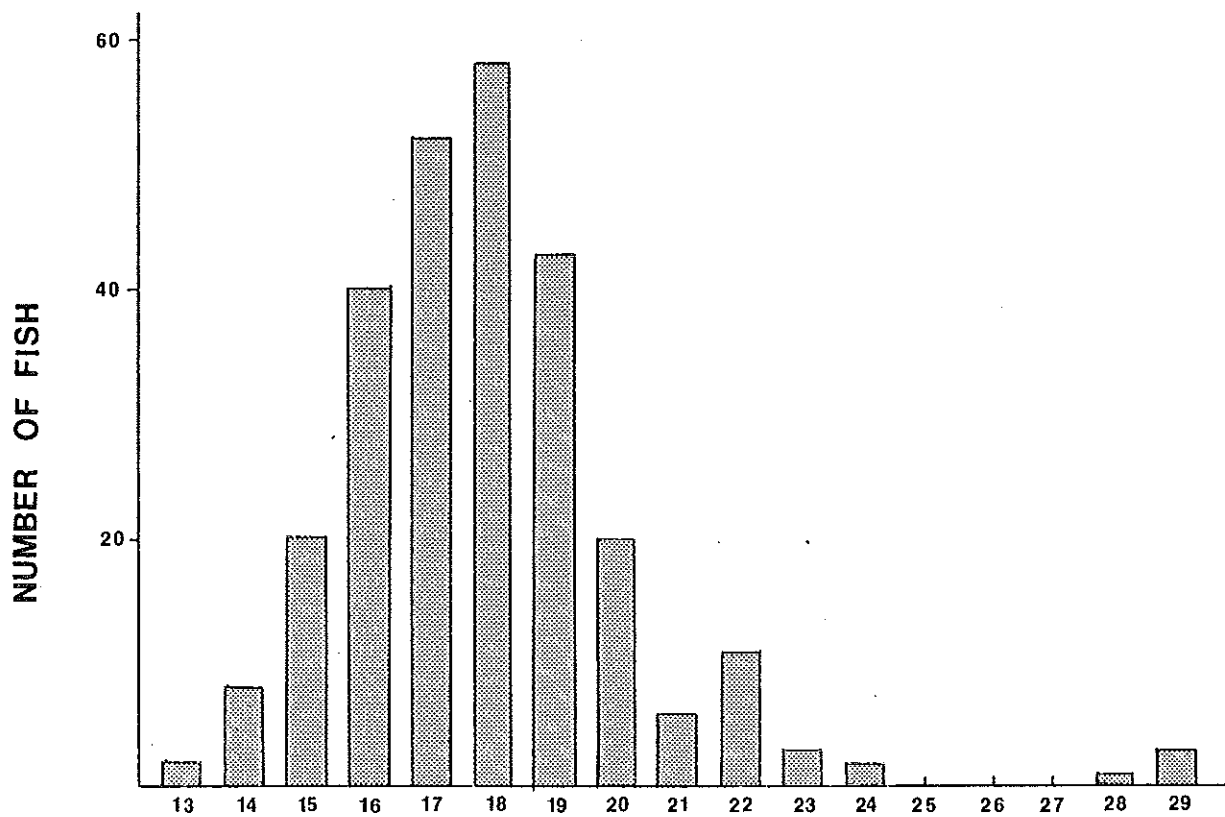


FIGURE 4. Average distribution of angling hours within a day on Lake Noquebay, winter 1981-82.



LENGTH IN HALF-INCH GROUPS

FIGURE 5. Length frequency of pumpkinseeds taken by anglers on Lake Noquebay, winter 1981-82.



LENGTH IN ONE-INCH GROUPS

FIGURE 6. Length frequency of northern pike taken by anglers on Lake Noquebay, winter 1981-82.

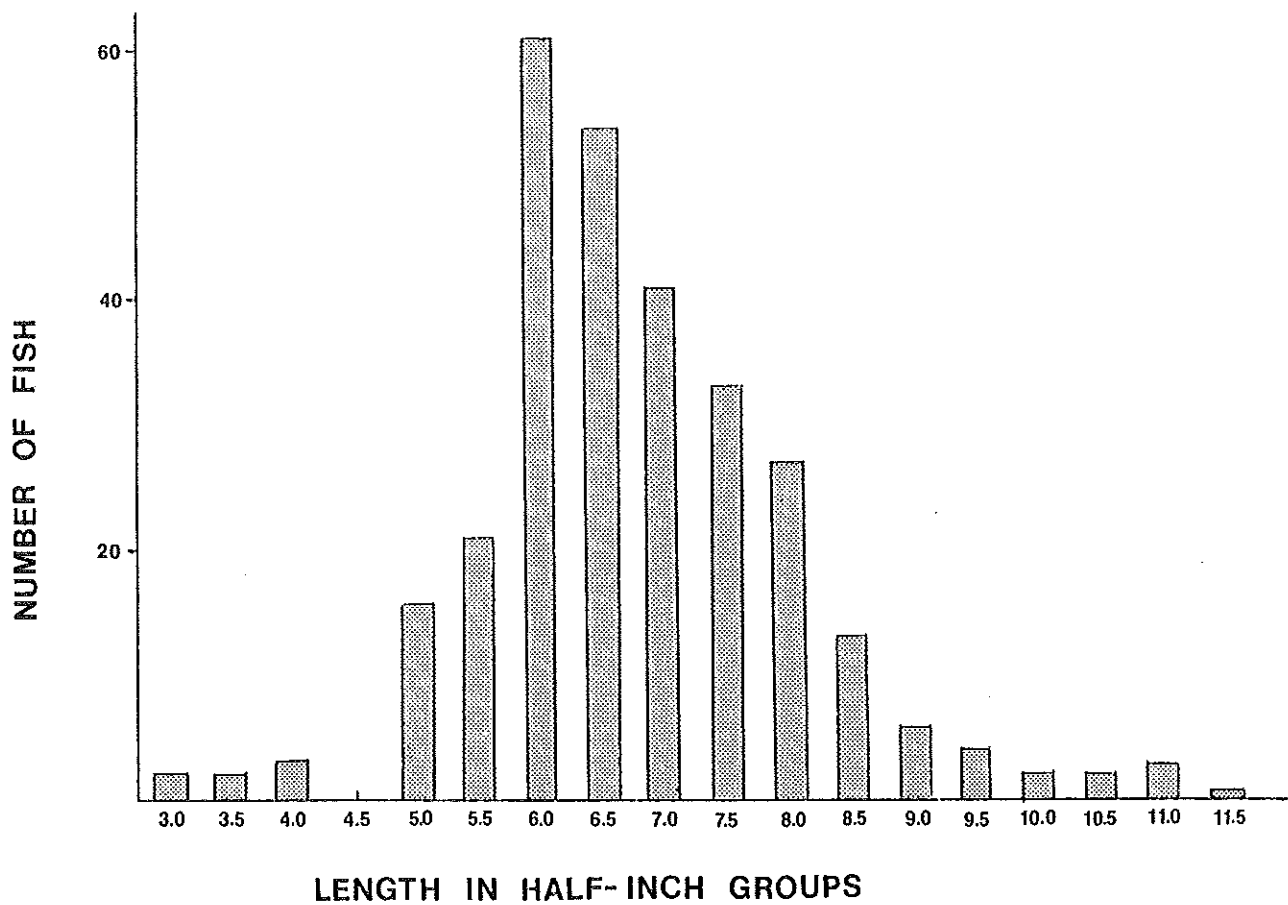


FIGURE 7. Length frequency of yellow perch taken by anglers on Lake Noquebay, winter 1981-82.

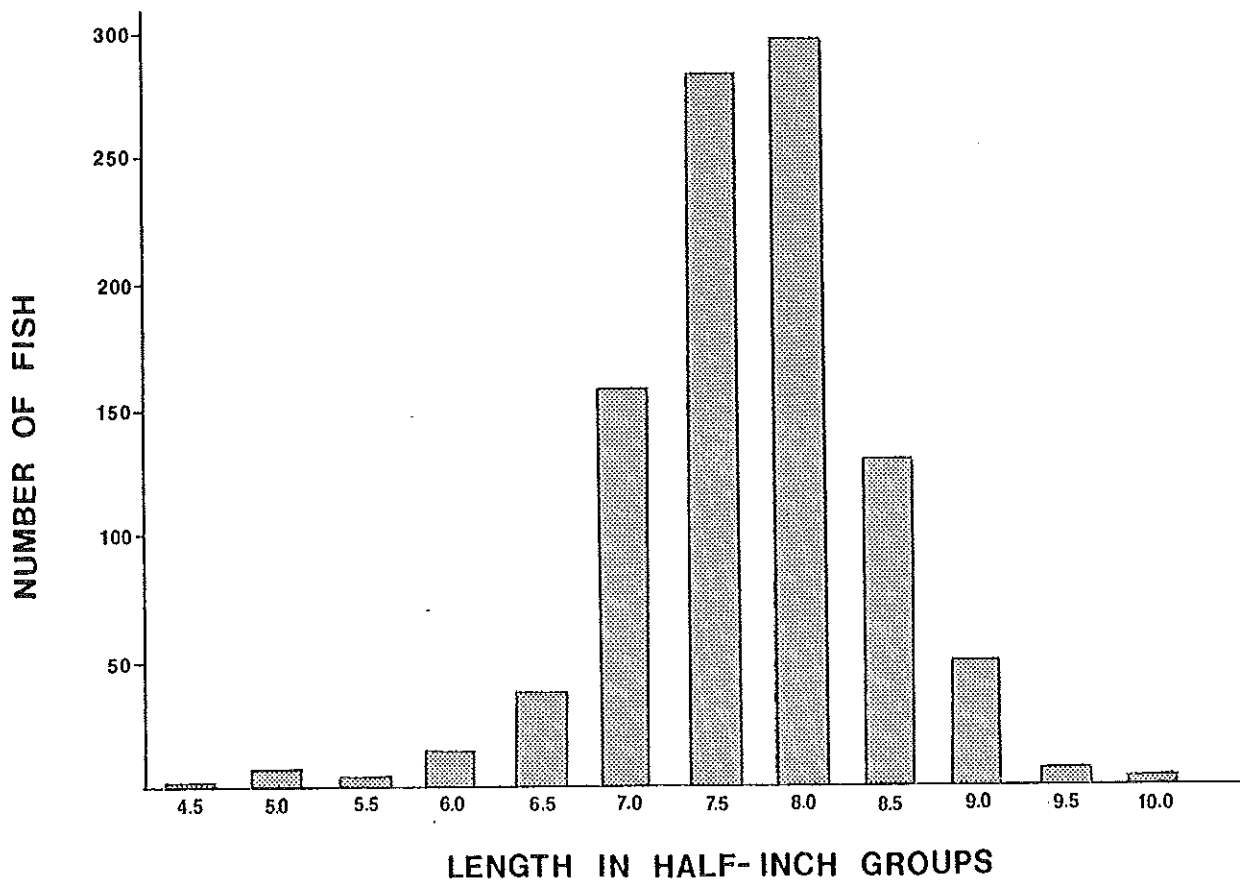


FIGURE 8. Length frequency of bluegills taken by anglers on Lake Noquebay, winter 1981-82.

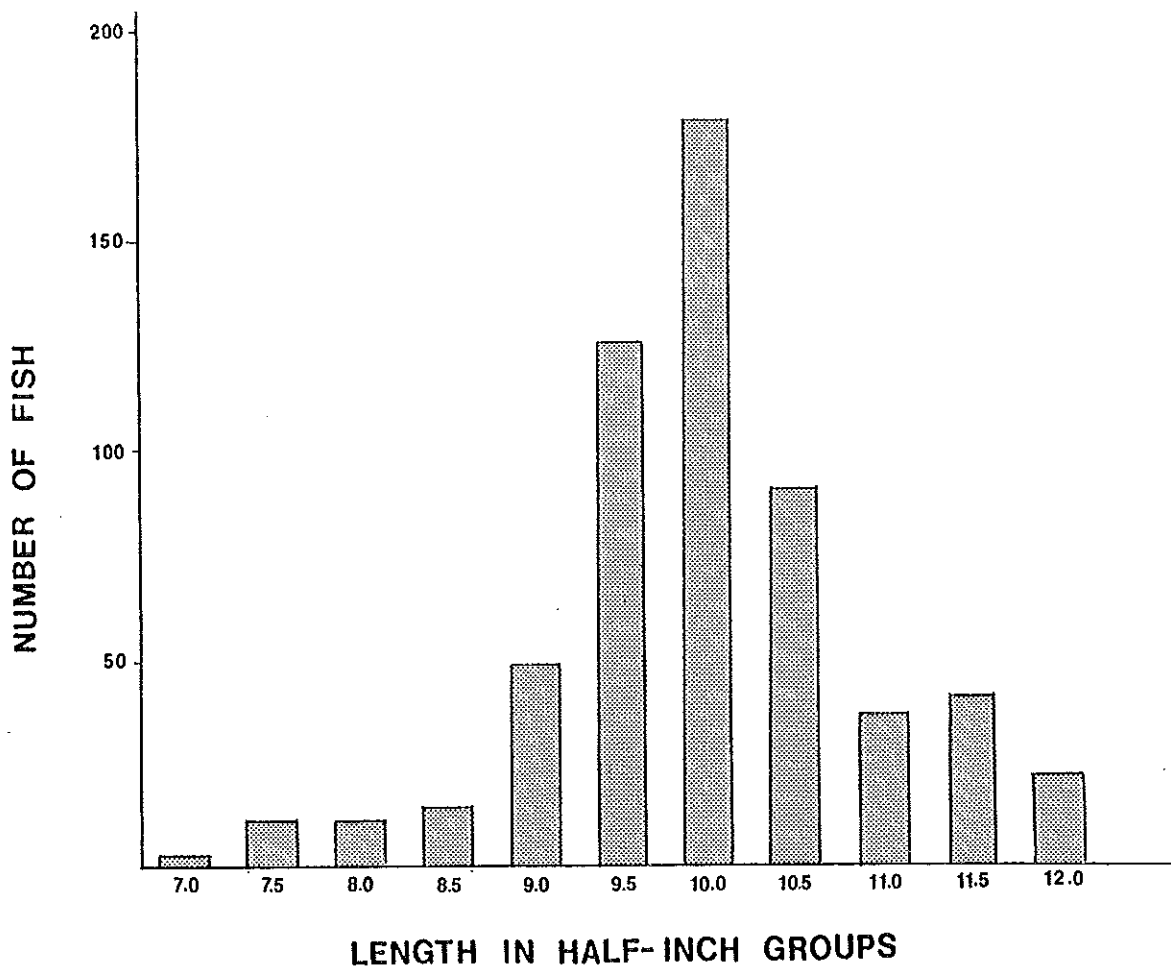


FIGURE 9. Length frequency of black crappies taken by anglers on Lake Noquebay, winter 1981-82.

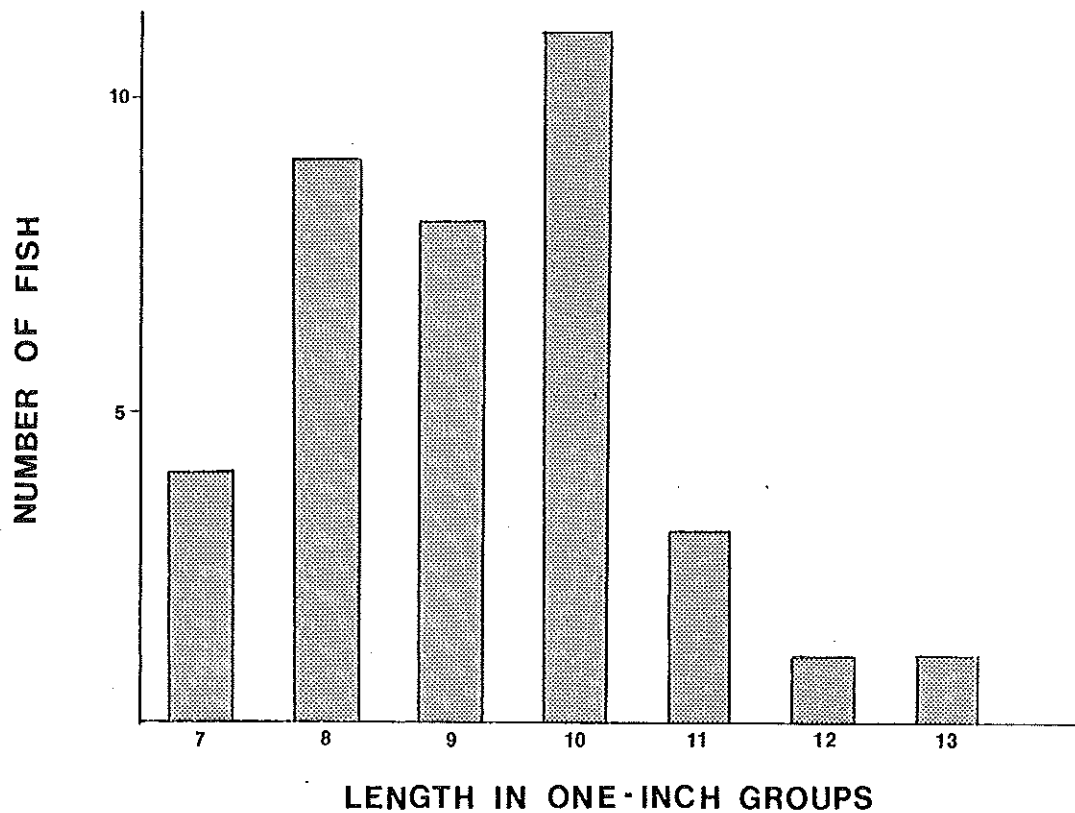
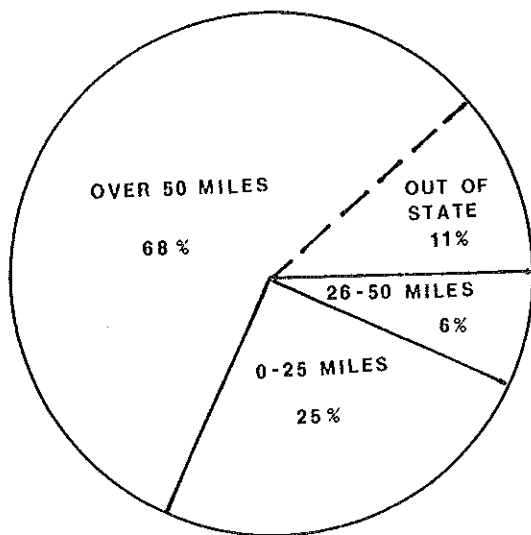


FIGURE 10. Length frequency of brook trout by anglers on Lake Noquebay, winter 1981-82.

OPEN WATER, 1977



ICE FISHING, 1981-82

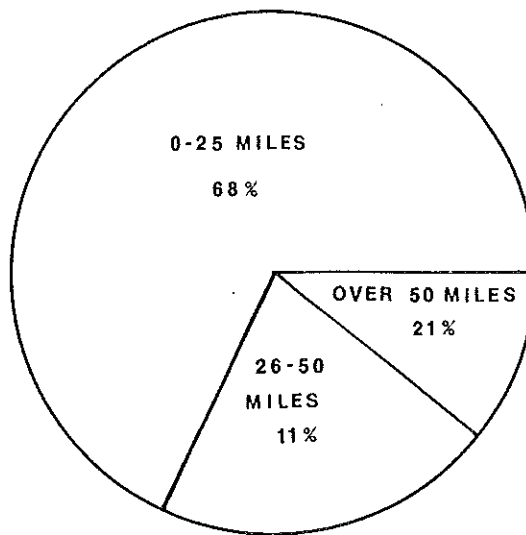


FIGURE 11. Distance anglers traveled to fish Lake Noquebay.

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